

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**WATERING FACILITY**

(No.)

CODE 614

**DEFINITION**

A device (tank, trough, or other watertight container) for providing animal access to water.

**PURPOSE**

To provide watering facilities for livestock and/or wildlife at selected locations in order to:

- ♦ protect and enhance vegetative cover through proper distribution of grazing;
- ♦ provide erosion control through better grassland management.
- ♦ protect streams, ponds and water supplies from contamination by providing alternative access to water.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all land uses where there is a need for new or improved watering facilities.

**CRITERIA**

**General Criteria Applicable To All Purposes**

This practice must conform to all federal, state, and local laws and regulations. Laws and regulations of particular concern include those involving water rights and use, water health and delivery, pollution control, property easements, wetlands, preservation of cultural resources, and endangered species.

Watering facilities shall have adequate capacity to meet the water requirements of the livestock and/or wildlife. This will include the

storage volume necessary to carry over between periods of replenishment.

Storage capacity of the entire watering system such as storage tanks and/or pipelines that feed watering facilities (tanks, troughs or fountains) by gravity can be included when determining the necessary storage volume between periods of replenishment.

***Definition of water facility storage devices***

Trough - A long, narrow, relatively shallow water receptacle to hold water for livestock and/or wildlife.

Tank - A round, oval, square or rectangular relatively deep water receptacle to hold water for livestock and/or wildlife.

Fountain - An automatic watering facility that is activated by livestock as they drink water with little or no storage capacity.

***Conventional water facility applications***

Conventional water facility applications apply to all situations that are not covered under intensive water facility applications. The minimum storage capacity of the watering facility is the volume that is readily available to livestock and shall be based on the frequency of checking water supply and livestock, livestock type and size, and type of water pumping system.

The minimum storage capacity for the watering facility shall be based on the type of water pumping system (never less than the frequency of checking water supply and livestock) is as follows:

- Electric water pumping and reliable spring developments: 2 to 3 days storage

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- Solar and wind water pumping: 3 to 7 days storage

Refer to Table 1 for the minimum daily stockwater requirements by livestock type for conventional water facility applications. The water supply flow rate shall have the capacity to provide the expected daily water requirements within 12-hours or less.

Conventional water facility applications will not be spaced further than shown in Table 2 "Maximum Water Facility Spacing".

### ***Intensive water facility applications***

Intensive water facility applications must have dependable water supplies (e.g. electric or reliable spring developments) and meet all of the following requirements. Intensive water facility applications will not be spaced further than shown in Table 2 "Maximum Water Facility Spacing". The livestock and water supply must be checked daily. If the above items are not applicable a conventional water facility application must be used.

When tanks and troughs are utilized, the minimum water storage capacity of the system is the 1-day water requirement for the livestock as shown in Table 1. The flow rate of the water supply for a tank or trough shall have the minimum capacity to provide the expected daily water requirements within 4-hours or less.

Fountains and troughs can only be utilized in conjunction with intensive water facility applications.

Fountains shall not be utilized unless there is 10 head of cattle, 5 head of horses/buffalo or 25 head of sheep, goats or hogs or less per fountain. The minimum flow rate for fountains shall be 0.25 gallons/minute/head for buffalo, lactating dairy cow, and horses, 0.2 gallons/minute/head for cattle or 0.02 gallons/minute/head for sheep, goats or hogs. There is no minimum water storage capacity of the system for fountains.

**<sup>1/</sup> Table 1. Minimum Daily Stockwater Requirements**

Livestock Type	Conventional Water Facility Application (Gal/day)	Intensive Water Facility Application (Gal/day)
Cow	12	17
Cow & Calf	15	20
Dairy Cow (lactating)	25	30
Horse	15	20
Buffalo	20	25
Sheep	1.5	3
Goats	1.5	3
Hogs	1.5	3
Deer	1.5	-
Antelope	1.5	-
Elk	6	-

<sup>1/</sup> These are minimum volumes, if livestock are larger than average or there are other planning issues, the volume of storage should be increased accordingly.

**Table 2. Maximum Water Facility Spacing**

Type of Terrain	Conventional Water Facility Maximum Travel Distance	<sup>1/</sup> Intensive Water Facility Maximum Travel Distance
Rough	½ mile	1/8 mile (660 feet)
Rolling	¾ mile	1/6 mile (880 feet)
Level	1 mile	<sup>2/</sup> ¼ mile

<sup>1/</sup> Livestock must be checked daily.

<sup>2/</sup> Assumes there are no visual obstructions in any direction between the livestock and the watering facility. If there are visual obstructions for intensive water facility applications use the maximum travel distance for rolling terrain.

### ***All water facility applications***

The minimum tank size shall be 6 feet in diameter or equivalent. The minimum trough rim length shall be 3 inches /head for lactating cow and buffalo, 2 inches/head for cattle and horses and 0.7 inches/head for sheep, goats or hogs.

The watering facility site shall be well drained, or drainage measures shall be provided. When necessary areas adjacent to the watering facility that will be trampled by livestock shall be graveled, paved, or otherwise treated to provide firm footing and reduce erosion. When the duration of use and site conditions dictate the need, the design of the protective surface around the watering facility shall be in accordance with the Heavy Use Area Protection (561) Conservation Practice Standard.

Automatic water level control and/or overflow facilities shall be provided as appropriate. Shields or covers to prevent damage by livestock to exposed valves or pipes shall be installed. Overflow shall be piped to a stable or suitable point of release. The watering facility and outlet pipes shall be protected from freezing and ice damage. Freeze-proof troughs, trickle flow controls, or electric/gas heaters may be used.

When watering facility inlets are connected to waterlines used for home/municipal water supplies (human consumption), double check valves and/or other measures required by local plumbing codes and the Nebraska Department of Health shall be strictly adhered to.

When a roof is placed over the watering facility to provide shade, the roof shall be designed for appropriate snow and wind loads and shall be able to withstand anticipated livestock and wildlife activities.

All materials shall have a life expectancy that meets or exceeds the planned useful life of the installation. Common construction materials are reinforced concrete, steel, fiberglass, rubber tire tanks, plastic and wood. All designs shall meet the industry standards for the material being used. Applicable design requirements and procedures can be found in Engineering Field Manual Supplement,

Chapter 3 "Montana Stockwater Pipeline Manual".

Concrete tanks shall be constructed from a concrete mix producing a minimum compressive strength of 3,000 psi at 28 days and must also be adequately reinforced. Galvanized steel tanks shall have a minimum thickness of 20 gauge. Polyethylene and fiberglass tanks shall have a minimum thickness of 3/16 inch and be made of ultraviolet resistant materials or shall have a durable coating to protect the structure from deterioration due to sunlight. The minimum nominal thickness of flexible membranes shall be 4 mils for polyvinyl chloride and polyethylene and 8 mils for butyl rubber.

Concrete, impervious earth, flexible membranes, wood or steel can be used for tank bases as appropriate. For detailed requirements for tanks, bases, walls and other component details of watering facilities refer to the Engineering Field Manual Supplement, Chapter 3 "Montana Stockwater Pipeline Manual".

### **CONSIDERATIONS**

Topography and drainage patterns should be evaluated to minimize trail erosion and erosion from tank overflow.

Consider the impacts of the watering facility on grazing distribution and future plans for a Prescribed Grazing system.

Watering facilities should be accessible to young livestock. Escape ramps for young livestock, birds and small animals should be installed.

Consider using cattle guards or some other form of tie down to prevent empty tanks from blowing off pads in high wind areas. Cattle guards should also be considered to discourage livestock from jumping into tanks and to protect the plumbing from being broken.

Consideration should be given to accessibility and wall height of watering facilities used in locations where various types and sizes of livestock will be using the facility.

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Adequate protection for livestock during the winter should be considered on water facility sites that are used during winter months.

Chemicals such as copper sulfate and chlorine can be recommended as needed, as long as local rules and regulations are followed;

### PLANS AND SPECIFICATIONS

Plans and specifications for installing watering facilities shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. If the watering facility is a component of a system that includes additional conservation practices, the information necessary to construct these additional practices will also be conveyed on the plans.

Development of plans will be guided by Engineering Field Handbook, Chapter 5, and shall be in accordance with National Engineering Manual, Parts 541 and 542.

### OPERATION AND MAINTENANCE

An O&M plan specific to the type of installed watering facility shall be provided to the landowner. The plan shall include, but not be limited to, the following provisions:

- check for debris, algae, sludge or other materials in the trough which may restrict the inflow or outflow system;
- check for leaks and repair immediately if any leaks are found;
- check the automatic water level device, tank heaters, trickle flow controls, plumbing, escape ramps and other components of a watering facility to insure proper operation;
- repair cattle guards as needed;
- check to ensure that adjacent areas are well protected against erosion;
- check to ensure the outlet pipe is freely operating and not causing erosion problems;
- prepare guidance for winter weather, such as adding material in the storage area to allow for ice expansion without damage;
- Algae and iron sludge accumulation should be addressed in areas with water quality that is known to cause problems.

### REFERENCES

Engineering Field Handbook, USDA-NRCS

National Engineering Manual, USDA-NRCS

Manual of Steel Construction, American Institute of Steel Construction

Timber, National Design Specification for Wood, American Forest and Paper Association

Concrete, ACI 318, American Concrete Institute

Masonry, Building Code Requirement for Masonry Structures, ACI 530, American Concrete Institute

Engineering Field Manual Supplement, Chapter 3 "Montana Stockwater Pipeline Manual" (located in NRCS field offices)

NRCS General Manual 420, Part 401